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WHAT IS CLAIMED IS:

1. A method of converting differentiated non-hormone producing pancreatic cells into differentiated hormone-producing cells, comprising:

a) culturing said differentiated non-hormone producing pancreatic cells in a first cell culture system with a first cell culture medium comprising a basal medium, with or without serum, and with or without growth factors;

under conditions which provide for converting said differentiated non-hormone producing pancreatic cells into stem cells; and

b) culturing said stem cells in a second cell culture system with a second cell culture medium

comprising at least one compound selected from Group A, wherein the compounds of Group A are selected from the group consisting of:

Betacellulin, Activin A, BMP-2, TGF- $\beta$  SRII, DMSO, Sonic Hedgehog, Laminin, Met-Enkephalin, DMF, and Cholera Toxin A;

and at least one compound selected from Group B, wherein the compounds of Group B are selected from the group consisting of:

Activin A, Atrial Natriuretic Peptide, Betacellulin, Bone Morphogenic Protein (BMP-2), Bone Morphogenic Protein (BMP-4), C natriuretic peptide (CNP), Caerulein, Calcitonin Gene Related Peptide (CGRP- $\alpha$ ), Cholecystokinin (CCK8-amide), Cholecystokinin octapeptide (CCK8-sulfated), Cholera Toxin B Subunit, Corticosterone (Reichstein's substance H), Dexamethasone, DIF-1, Differanisole A, Dimethylsulfoxide (DMSO), EGF, Endothelin 1, Exendin 4, FGF acidic, FGF2, FGF7, FGFb, Gastrin I, Gastrin Releasing Peptide (GRP), Glucagon-Like Peptide 1 (GLP-1), Glucose, Growth Hormone, Hepatocyte Growth Factor (HGF), IGF-1, IGF-2, Insulin, KGF, Lactogen, Laminin, Leu-

Enkephalin, Leukemia Inhibitory Factor (LIF), Met-Enkephalin, n Butyric Acid, Nerve Growth Factor ( $\beta$ -NGF), Nicotinamide, n-n-dimethylformamide (DMF), Parathyroid Hormone Related Peptide (Pth II RP), PDGF AA + PDGF BB MIX, PIGF (Placental GF), Progesterone, Prolactin, Putrescine Dihydrochloride Gamma-Irradiated Cell Culture, REG1, Retinoic Acid, Selenium, Selenious Acid, Sonic Hedgehog, Soybean Trypsin Inhibitor, Substance P, Superoxide Dismutase (SOD), TGF- $\alpha$ , TGF- $\beta$  sRII, TGF- $\beta$ 1, transferrin, Triiodothyronine (T3), Trolox, Vasoactive Intestinal Peptide (VIP), VEGF, Vitamin A, and Vitamin E;

under conditions which provide for differentiating said stem cells into hormone-producing cells.

2. The method of Claim 1, wherein the second cell culture medium comprises at least two compounds selected from Group A and at least two compounds selected from Group B.
3. The method of Claim 1, wherein the second cell culture medium comprises at least three compounds selected from Group A and at least three compounds selected from Group B.
4. The method of Claim 1, wherein the second cell culture medium comprises at least four compounds selected from Group A and at least four compounds selected from Group B.
5. The method of Claim 1, wherein the second cell culture medium comprises at least five compounds selected from Group A and at least five compounds selected from Group B.
6. The method of Claim 1, wherein the second cell culture medium comprises at least six compounds selected from Group A and at least six compounds selected from Group B.
7. A method of culturing stem cells into differentiated hormone-producing cells, comprising culturing the stem cells in a cell culture system with a cell culture medium whereby said stem cells are differentiated into hormone-producing cells wherein said culture medium comprises

basal medium without serum and at least one compound selected from Group A wherein the compounds of Group A are selected from the group consisting of: Betacellulin, Activin A, BMP-2, TGF- $\beta$  SRII, DMSO, Sonic Hedgehog, Laminin, Met-Enkephalin, DMF, and Cholera Toxin A;

and at least one compound selected from Group B, wherein the compounds of Group B are selected from the group consisting of: Activin A, Atrial Natriuretic Peptide, Betacellulin, Bone Morphogenic Protein (BMP-2), Bone Morphogenic Protein (BMP-4), C natriuretic peptide (CNP), Caerulein, Calcitonin Gene Related Peptide (CGRP- $\alpha$ ), Cholecystokinin (CCK8-amide), Cholecystokinin octapeptide (CCK8-sulfated), Cholera Toxin B Subunit, Corticosterone (Reichstein's substance H), Dexamethasone, DIF-1, Differanisole A, Dimethylsulfoxide (DMSO), EGF, Endothelin 1, Exendin 4, FGF acidic, FGF2, FGF7, FGFb, Gastrin I, Gastrin Releasing Peptide (GRP), Glucagon-Like Peptide 1 (GLP-1), Glucose, Growth Hormone, Hepatocyte Growth Factor (HGF), IGF-1, IGF-2, Insulin, KGF, Lactogen, Laminin, Leu-Enkephalin, Leukemia Inhibitory Factor (LIF), Met-Enkephalin, n Butyric Acid, Nerve Growth Factor ( $\beta$ -NGF), Nicotinamide, n-n-dimethylformamide (DMF), Parathyroid Hormone Related Peptide (Pth II RP), PDGF AA + PDGF BB MIX, PIGF (Placental GF), Progesterone, Prolactin, Putrescine Dihydrochloride Gamma-Irradiated Cell Culture, REG1, Retinoic Acid, Selenium, Selenious Acid, Sonic Hedgehog, Soybean Trypsin Inhibitor, Substance P, Superoxide Dismutase (SOD), TGF- $\alpha$ , TGF- $\beta$  sRII, TGF- $\beta$ 1, transferrin, Triiodothyronine (T3), Trolox, Vasoactive Intestinal Peptide (VIP), VEGF, Vitamin A, and Vitamin E.

8. The method of Claim 7, wherein the cell culture medium comprises at least two compounds selected from Group A and at least two compounds selected from Group B.

9. The method of Claim 7, wherein the cell culture medium comprises at least three compounds selected from Group A and at least three compounds selected from Group B.

10. The method of Claim 7, wherein the cell culture medium comprises at least four compounds selected from Group A and at least four compounds selected from Group B.

(1) (2)

11. The method of Claim 7, wherein the cell culture medium comprises at least five compounds selected from Group A and at least five compounds selected from Group B.

12. The method of Claim 7, wherein the cell culture medium comprises at least six compounds selected from Group A and at least six compounds selected from Group B.